



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,969	07/08/2004	Shinichi Miwa	120345	3384
25944	7590	08/29/2006		
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320				
			EXAMINER CLEMENTE, ROBERT ARTHUR	
			ART UNIT 1724	PAPER NUMBER

DATE MAILED: 08/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/500,969

Applicant(s)

MIWA ET AL.

Examiner

Robert A. Clemente

Art Unit

1724

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18 - 34 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 18 - 34 is/are rejected.
- 7) ☒ Claim(s) 18, 23 and 29 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: On page 3 lines 7 and 18, "through-hales" should be --through-holes--. On page 15 line 24, "lace track" should be --race track--.

Appropriate correction is required.

Claim Objections

2. Claims 18 and 23 are objected to because of the following informalities: In the fifth line of claim 18 and sixth line of claim 23, the term "through-hales" should be --through-holes--.

Appropriate correction is required.

3. Claim 29 is objected to because of the following informalities: In the second paragraph, the phrase "in the peripheral part" begins the paragraph when it should be at the end of the paragraph after "positioned".

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 1724

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 18 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by International Publication No. WO 97/24516 to Jeong et al.

Jeong et al. teaches a honeycomb filter for trapping particulate matter contained in dust-containing fluid; the filter comprising a number of through-holes surrounded by partition walls and extending in an axial direction; the partition walls having filterability, predetermined through-holes being plugged at one end, remaining through-holes being plugged at the other end; wherein in a section of the honeycomb filter perpendicular to the axial direction, heat capacity in a central part of the honeycomb filter is higher than that in a peripheral part of the honeycomb filter; and wherein in an end face of the honeycomb filter in the axial direction, a non-plugged through-hole end portion is plugged in the central part of the honeycomb filter. See figure 8 and respective portions of the specification. Jeong et al. shows a honeycomb filter (4) with a plurality of inlet ports (37), or through-holes, and closed, or plugged, ends (36) in the other passages.

Additionally, as shown in figure 6, the center portion is plugged where inlet ports would be, thus giving the center portion a higher heat capacity.

6. Claims 18 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 7,056,365 to Ichikawa et al.

Ichikawa et al. teaches a honeycomb filter for trapping particulate matter contained in dust-containing fluid; the filter comprising a number of through-holes surrounded by partition walls and extending in an axial direction; the partition walls having filterability, predetermined through-holes being plugged at one end, remaining through-holes being plugged at the other end; wherein in a section of the honeycomb filter perpendicular to the axial direction, heat capacity in a central part of the honeycomb filter is higher than that in a peripheral part of the honeycomb filter; and wherein in the section of the honeycomb filter perpendicular to the axial direction, a thickness of the partition wall in the central part is set to be larger than that of the partition wall in the peripheral part. See figure 8 and respective portions of the specification. Ichikawa et al. shows a honeycomb member (10) with through-holes (3). It is not shown in the drawings, but disclosed in column 7 lines 50 – 53, that to use the honeycomb member as a filter a predetermined amount of through-holes would be plugged. As shown in figure 8, the partition walls are thicker in the center than in the peripheral part, thus giving the center portion a higher heat capacity.

7. Claims 18 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 4,667,469 to Abthoff et al.

Abthoff et al. teaches a honeycomb filter for trapping particulate matter contained in dust-containing fluid; the filter comprising a number of through-holes surrounded by partition walls and extending in an axial direction; the partition walls having filterability, predetermined through-holes being plugged at one end, remaining through-holes being plugged at the other end; wherein in a section of the honeycomb filter perpendicular to the axial direction, heat capacity in a central part of the honeycomb filter is higher than that in a peripheral part of the honeycomb filter; and wherein the plugging is performed in the honeycomb filter such that a plugging depth is large in the central part, and small in the peripheral part. See figure 1 and respective portions of the specification. Abthoff et al. discloses a honeycomb filter made from porous ceramic material to filter diesel exhaust gas. As shown in figure 1, predetermined ducts, or through-holes, are plugged with plugs (1,2,3,4,5,6) whose plugging depth increases towards the center of the filter.

8. Claims 23, 26, 29 and 31 – 34 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent Application Publication No. 2004/0045267 to Ichikawa et al.

Ichikawa et al. teaches a honeycomb filter for trapping particulate matter contained in dust-containing fluid; the filter comprising a number of through-holes surrounded by partition walls and extending in an axial direction; the partition walls having filterability, predetermined through-holes being plugged at one end, remaining through-holes being plugged at the other end; wherein the honeycomb filter comprises an assembly of a plurality of honeycomb segments, and in a section of each honeycomb segment perpendicular to the axial direction, a heat capacity of a central part of the honeycomb filter is higher than that of a peripheral part of the honeycomb

Art Unit: 1724

filter. See figures 2 and 3, and respective portions of the specification. In figure 2, Ichikawa et al. shows a honeycomb filter (1), with honeycomb segments (12) bonded together by adhesive (8A, 8B). In figure 3, it is shown that the honeycomb segments contain through-holes (3a, 3b) that are plugged in a checkered, or predetermined, manner. Further discussed in examples 6 and 7, and as shown in tables 3 and 5, the bonding material in the center has a higher heat capacity, which gives the central part of the filter a higher heat capacity than that of the peripheral part. Additionally, in regard to claim 29, the bonding material has a higher thermal conductivity in the central region, giving the central part of the filter a higher thermal conductivity than the peripheral part.

Further in regard to claim 32, Ichikawa teaches through-holes that can be triangular, tetragonal, hexagonal, or corrugated in shape. It is shown in figure 3, that the through holes are rectangular, or tetragonal, in shape.

In regard to claim 26, as shown in figure 2, the central part of the filter is made up of four filter segments (12). The entire filter is made of approximately 14 – 15 filter segments. Therefore the center section is shown to be less than 90% of the whole honeycomb filter.

In regard to claim 31, Ichikawa et al. teaches using a filter material selected from the group consisting of SiC, Si₃N₄, alumina, mullite, aluminum titanate, zirconium phosphate, and lithium aluminum silicate as a main crystal phase. It is disclosed, in paragraph 0030, that SiC is a main component of the honeycomb filter.

In regard to claims 33 and 34, Ichikawa et al. teaches the honeycomb segments carrying a catalyst, wherein the catalyst contains at least one selected from the group

Art Unit: 1724

consisting of Pt, Pd, Rh, K, Li, and Na. In paragraph 0037, it Ichikawa et al. discloses loading the invention with a metal having catalytic activity. Further in the same paragraph, examples of metals are given as Pt, Pd, and Rh.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,750,026 to Gadkaree et al. in view of US Patent No. 3,853,485 to Hogan.

Gadkaree et al. discloses, as shown in figure 1, a basic honeycomb filter (10), with cells (12), or through-holes, which are plugged with plugs (16) in a predetermined manner. Gadkaree et al. does not disclose increasing the cell density in the central portion of the filter in order to give this region a larger heat capacity. Hogan discloses a honeycomb member (10) used as a catalytic converter in an automobile, as seen in

Art Unit: 1724

figure 2. Hogan shows passages (11), or through-holes, which are more densely packed in the center than in the peripheral region.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the honeycomb filter of Gadkaree et al. to include a higher cell density in the central part as suggested by Hogan, in order to make the filter more resistant to thermal and mechanical stresses.

12. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Application Publication No. 2004/0045267 to Ichikawa et al. in view of US Patent No. 7,056,365 to Ichikawa et al.

Patent Application Publication No. 2004/0045267 is discussed above in paragraph 8. In this document, a honeycomb filter having a thicker partition wall for the honeycomb section in the central part of the filter was not disclosed. US Patent No. 7,056,365 is discussed above in paragraph 6. This document teaches having thicker partition walls in the center region of a single honeycomb segment filter.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify US Patent Application Publication No. 2004/0045267 to include thicker partition walls in the segment in the center of the filter than the segment in the peripheral part as suggested by US Patent No. 7,056,365. This modification would allow for stronger partition walls in the center region that would better be able to handle the higher stresses there.

Further in regard to claim 25, in column 7 lines 45 – 47, the secondary reference teaches the ratio of the thickness of the partition walls should be 1.03 or more.

Art Unit: 1724

13. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Application Publication No. 2004/0045267 and Patent No. 7,056,365 as applied to claims 24 and 25 above, and further in view of US Patent Application Publication No. 2004/0142145 to Hashimoto et al.

Patent Application Publication No. 2004/0045267 and Patent No. 7,056,365 are discussed above in paragraph 12. Both do not disclose gradually reducing the thickness of the partition wall toward to peripheral part from the center part of the filter. Hashimoto et al. discloses a honeycomb filter in which the peripheral part of the filter has a higher heat capacity than the central part, as disclosed in the last two lines of paragraph 0009. Shown in figure 6 is an embodiment in which the partition walls (10) are thicker on the outside than in the central part of the filter. These partition walls gradually are reducing in thickness from the outside, or area with the largest heat capacity, to the central region with the lowest heat capacity.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Patent Application Publication No. 2004/0045267 and Patent No. 7,056,365 to includes gradually reduced partition walls from the center, or area with the highest heat capacity, to the peripheral part with the lowest heat capacity as suggested by Hashimoto et al., in order to achieve a smooth transition between the areas of differing heat capacity.

14. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Application Publication No. 2004/0045267 to Ichikawa et al. in view of World Intellectual Property Publication No. WO 01/53232 A1 to Nada et al.

Ichikawa et al. is discussed above in paragraph 8. Ichikawa et al. does not disclose using a thicker bonding material in the central portion of the filter than in the peripheral portion. Nada et al. discloses, in then English language abstract, a ceramic structure with body segments (3a, 3b). The ceramic structure can be seen to be a honeycomb shape. Figure 2 shows a thicker section (5c) being used to bond the segments in the center than the thinner section (5a) used to bond the segments in the peripheral part.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ichikawa et al. to include thicker bonds in the center part of the filter than in the peripheral part as suggested by Nada et al., in order allow for stronger bonds in the center region where the higher stresses are.

15. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent Application Publication No. 2004/0045267 to Ichikawa et al. in view of US Patent No. 4,667,469 to Abthoff et al.

Ichikawa et al. is discussed above in paragraph 8. Ichikawa et al. does not disclose increasing the plugging depth in the central part of the filter. Abthoff et al. is discussed above in paragraph 7. Abthoff et al. discloses a monolithic honeycomb filter with plugging depths that are larger in the center of the filter than in the peripheral part.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Ichikawa et al. to have larger plugging depths in the center of the filter than in the peripheral as suggested by Abthoff et al., in order to affect the heat

Art Unit: 1724

capacity of the central part of the filter without the difficulty of having to change aspects of the bonds or partition walls.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kragle discloses a honeycomb member with a greater cell density in the center.

Bardon et al. discloses a honeycomb filter with segments bonded together.

Gabe et al. shows a honeycomb filter with all the through-holes in the center plugged.

Maier et al. discloses a porous diesel soot collector made from SiC.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert A. Clemente whose telephone number is (571) 272-1476. The examiner can normally be reached on M-F, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Smith Duane can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1724

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Robert A Clemente
Examiner
Art Unit 1724

RAC

DUANE SMITH
PRIMARY EXAMINER
D. Smith
8-23-06